What is claimed is:

1. A fluid-flow machine comprising:

at least one rotor equipped with blades;

at least one stator equipped with vanes; the rotor being supported in a casing by a rotating shaft;

wherein, a form of annulus is provided whose cross-sectional area in a stage consisting of at least one rotor and one stator results in a rotor-stator contraction ratio QRS which satisfies the equation:

$$[0.2 + (KT - 0.45)^{0.1}] < QRS < 3.0,$$

where QRS is defined by the formula

$$QRS = KR/KS,$$

where KT is a total-stage contraction; QRS and KT being calculated as follows:

$$QRS = KR/KS \text{ with } KR = ARI/ARA$$
$$\text{and } KS = ASI/ASA$$
$$\text{and } KT = ARI/ASA$$

where ARI, ARA, ASI and ASA are calculated as follows:

$$ARI = \pi (R_2{}^2 - R_1{}^2)$$
$$ARA = \pi (R_4{}^2 - R_3{}^2)$$
$$ASI = \pi (R_6{}^2 - R_5{}^2)$$
$$ASA = \pi (R_8{}^2 - R_7{}^2)$$

where, in a direction of flow of the fluid-flow machine:

R_1 is a radius at a base point of a rotor blade leading edge on the rotor shaft,

R_2 is a radius at a radial outer point of the rotor blade leading edge,

R_3 is a radius at a base point of a rotor blade trailing edge on the rotor shaft,

R_4 is a radius at a radial outer point of the rotor blade trailing edge,

R_5 is a radius at a radial inner point of a stator vane leading edge,

R_6 is a radius at a radial outer point of the stator vane leading edge,

R_7 is a radius at a radial inner point of a stator vane trailing edge, and

R_8 is a radius at a radial outer point of the stator vane trailing edge.

2. A fluid-flow machine in accordance with Claim 1, wherein the value of QRS is obtained by shaping a contour of at least one of a hub and the rotor shaft, respectively.

3. A fluid-flow machine in accordance with Claim 2, and further comprising the casing, wherein the value of QRS is also

at least partially obtained by shaping a contour of the casing.

4. A fluid-flow machine in accordance with Claim 3, having a single stage comprising a rotor and a stator.

5. A fluid-flow machine in accordance with Claim 3, having multiple stages, each comprising a rotor and a stator.

6. A fluid-flow machine in accordance with Claim 1, and further comprising the casing, wherein the value of QRS is at least partially obtained by shaping a contour of the casing.

7. A fluid-flow machine in accordance with Claim 1, having a single stage comprising a rotor and a stator.

8. A fluid-flow machine in accordance with Claim 1, having multiple stages, each comprising a rotor and a stator.

9. A fluid-flow machine in accordance with Claim 1, wherein a second form of annulus is provided whose cross-sectional areas result in axial-gap contractions KX1 and KX2 which satisfy the following equations:

$$0.8 < KX1 < 1.0$$
$$0.8 < KX2 < 1.0,$$

where KX1 and KX2 satisfy the following equations:

$$KX1 = ARA/ASI$$
$$KX2 = ASA/ARI2,$$

where ARI2 is calculated as follows:

$$ARI2 = \pi (R_{10}^2 - R_9^2)$$

where, in the direction of flow of the fluid-flow machine:

R_9 is a radius at a radial inner point of a leading edge of a downstream next rotor blade, and

R_{10} is a radius at a radial outer point of the leading edge of the downstream next rotor blade.

10. A fluid-flow machine in accordance with Claim 9, wherein the values of at least one of QRS, KX1 and KX2, respectively, are obtained by shaping a contour of at least one of a hub and the rotor shaft, respectively.

11. A fluid-flow machine in accordance with Claim 10, and further comprising the casing, wherein the values of at least one of QRS, KX1 and KX2, respectively, are also at least partially obtained by shaping a contour of the casing.

12. A fluid-flow machine in accordance with Claim 11, having a single stage comprising a rotor and a stator.

13. A fluid-flow machine in accordance with Claim 11, having multiple stages, each comprising a rotor and a stator.

14. A fluid-flow machine in accordance with Claim 9, and further comprising the casing, wherein the values of at least one of QRS, KX1 and KX2, respectively, are at least partially obtained by shaping a contour of the casing.

15. A fluid-flow machine in accordance with Claim 9, having a single stage comprising a rotor and a stator.

16. A fluid-flow machine in accordance with Claim 9, having multiple stages, each comprising a rotor and a stator.

17. A fluid-flow machine comprising:

at least one rotor equipped with blades;

at least one stator equipped with vanes, the rotor being supported in a casing by a rotating shaft;

wherein a form of annulus is provided whose cross-sectional areas result in axial-gap contractions KX1 and KX2 which satisfy the following equations:

$$0.8 < KX1 < 1.0$$
$$0.8 < KX2 < 1.0,$$

where KX1 and KX2 satisfy the following equations:

$$KX1 = ARA/ASI$$
$$KX2 = ASA/ARI2,$$

where ARA, ASI, ASA and ARI2 are calculated as follows:

$$ARA = \pi \ (R_4{}^2 - R_3{}^2)$$
$$ASI = \pi \ (R_6{}^2 - R_5{}^2)$$
$$ASA = \pi \ (R_8{}^2 - R_7{}^2)$$
$$ARI2 = \pi \ (R_{10}{}^2 - R_9{}^2),$$

where, in a direction of flow of the fluid-flow machine:

R_3 is a radius at a base point of a rotor blade trailing edge on the rotor shaft,

R_4 is a radius at a radial outer point of the rotor blade trailing edge,

R_5 is a radius at a radial inner point of a stator vane leading edge,

R_6 is a radius at a radial outer point of the stator vane leading edge,

R_7 is a radius at a radial inner point of a stator vane trailing edge,

R_8 is a radius at a radial outer point of the stator vane trailing edge,

R_9 is a radius at a radial inner point of a leading edge of a downstream next rotor blade, and

R_{10} is a radius at a radial outer point of the leading edge of the downstream next rotor blade.

18. A fluid-flow machine in accordance with Claim 17, wherein the values of at least one of KX1 and KX2, respectively, are obtained by shaping a contour of at least one of a hub and the rotor shaft, respectively.

19. A fluid-flow machine in accordance with Claim 18, and further comprising the casing, wherein the values of at least one of KX1 and KX2, respectively, are also at least partially obtained by shaping a contour of the casing.

20. A fluid-flow machine in accordance with Claim 19, having a single stage comprising a rotor and a stator.

21. A fluid-flow machine in accordance with Claim 19, having multiple stages, each comprising a rotor and a stator.

22. A fluid-flow machine in accordance with Claim 17, and further comprising the casing, wherein the values of at least one of KX1 and KX2, respectively, are at least partially obtained by shaping a contour of the casing.

23. A fluid-flow machine in accordance with Claim 17, having a single stage comprising a rotor and a stator.

24. A fluid-flow machine in accordance with Claim 17, having multiple stages, each comprising a rotor and a stator.